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Virginia Museum of Fine Arts

Demand Flow from Siemens helps reduce energy consumption, meet state mandate and optimizes critical building conditions.

"Today, our redesigned central plant delivers enough chilled water to maintain our building conditions, using the same capacity as before – but it's now cooling an additional 9,290 m²."

Mike Slatner,
Building Superintendent
Virginia Museum of Fine Arts

The building

Since opening its doors in 1936 the Virginia Museum of Fine Arts (VMFA) has grown to become one of the state's premier institutions, housing 22,000 works of art from across the globe, with some that are more than 5,000 years old.

From 1936 through 1985, the VMFA had undergone four facility expansions. Each time it addressed chilled water needs by adding piping and relying on existing pumps to provide water flow throughout the complex. In 1997 the museum updated the central chilled water plant by adding pumps and a primary/secondary loop system.

The challenge

The plant could deliver ample chilled water but developed low delta problems and had deliverable capacity issues. In May 2010, VMFA began its latest expansion project that would add 15,330 m², increasing the size of the museum by 43%. For this project, the VMFA was primarily concerned with maintaining and improving environmental conditions in its galleries while addressing the inherent design issues that were compromising the performance of the chilled water plant.

Answers for infrastructure.

The solution

To achieve the VMFA's objectives, Siemens expanded the building automation system and implemented Demand Flow™ chiller optimization as part of a performance contract that would fund renovations through realized energy savings.

In addition, the performance contract included:
– Replacement of two towers with four 1,700 kW towers with variable frequency drives (VFDs)
– Installation of four 1,700 kW chillers
– New condenser water pumps with VFDs
– Steam boiler control upgrades
– Lighting modifications
– Water improvements
– Coil and pipe cleaning

The redesigned central chiller water plant portion of the project exceeded the museum's expectations, especially with regard to reducing energy consumption.

The project achieved the following results:
– The entire expanded facility is adequately cooled using only two of the four chillers in the updated and optimized central plant
– Demand Flow optimization allows the museum to maintain its critical humidity and temperature conditions at much lower capacities
– Siemens completed the project within the required time frame while accommodating ongoing museum site expansion and normal facility functions
– The annual energy cost savings have exceeded the US$250,000 of projected savings

The reduced energy consumption, in combination with the other improvement measures helped the VMFA exceed the governor's executive order of a 20% reduction in energy usage. Further, the museum took advantage of the utility savings to pay for the equipment renovations.

Highlights

■ Over US$250,000 in annual energy savings

■ Exceeds State of Virginia mandate for 20% reduction in energy usage

■ Maintains critical humidity and temperature requirements with less capacity